

Description

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Method for Producing a Multi-Layer Carbon Brush

10 The invention relates to a method for producing a multi-layer carbon brush consisting of at least two electrically conductive functional layers made of carbon material and at least one insulating layer made of electrically insulating material and continuously running between the successive first functional layers.

15 Multi-layer carbon brushes, which consist of carbon bars and insulating layers extending between them, are frequently used for smaller reversible motors such as those found in washing machines. The insulating layer can consist of a film, an insulating adhesive, synthetic resin, or one or more powder resins. Due to the higher transverse resistance
20 the current flowing between the two disks of a commutator covered by the carbon brush is reduced, thereby improving commutation.

The familiar multi-layer carbon brushes of the type described above are generally produced by aligning initially heat-treated carbon plates with each other in such a manner that allows a film to be inserted between them. The products are then machined and
25 shaped before the ropes or cords are finally inserted.

We are also aware of carbon brushes described as multi-layer carbon brushes in which the layers are all electrically conductive, yet wherein each layer can each exhibit different mechanical properties. A carbon brush of this type is described in DE 91 06 977 U1.
30 Being of different material composition, the various layers – also referred to as zones – can be formed by successively placing two starting layers of different material composition in a mold prior to pressing the carbon brushes and then by pressing said

The object of the present invention is to develop a process for producing a multi-layer carbon brush consisting of at least two electrically conductive functional layers and an insulating layer running between successive functional layers in such a manner that constitutes both an improvement and simplification of the current process and also allows for the easy integration of the insulating layer with the application area of the multi-layer carbon brush. The adjustment of material properties such as porosity or friction values shall also be facilitated without difficulty. Moreover, easy individual adjustment of the thickness levels of the functional layers shall be enabled without requiring complex machining measures.

The invention demonstrates that the problem can be essentially resolved by applying layers of the carbon material or carbon-containing material as filler and the electrically insulating material – in powder form - into a mold following a sequence that corresponds to the layer sequence of the multi-layer carbon brush to be produced, before pressing and finally subjecting the product to heat-treatment. When doing so, the insulating material should be added into the mold with an appropriate layer height so that the insulating layer in the finished multi-layer carbon brush has a thickness d of preferably $100\text{ }\mu\text{m} \leq d \leq 500\text{ }\mu\text{m}$.

The invention is particularly characterized by a method for producing multi-layer carbon brushes consisting of at least two electrically conductive functional layers made of carbon material and at least one insulating layer made of electrically insulating material running between successive functional layers and comprises the following procedural steps:

- creation of a plate by filling a mold with layers of carbon material or a carbon-containing material in powder form and electrically insulating material in powder form or in the form of a film corresponding to the multi-layer carbon brush to be produced,
- pressing of the layers present in the mold to form the plate,
- heat treatment of the plate, and